

Listing of Claims

This listing of claims replaces all prior versions, and listings, of claims in the application:

1-14. (Canceled)

15. (Currently Amended) A battery backup apparatus connected with a movable barrier operator which includes a DC power supply, the battery backup apparatus comprising:
a battery;
a battery charging circuit coupled to the battery; and
a ~~unidirectional~~ conduction path between the battery ~~backup apparatus~~ and the movable barrier operator, the ~~unidirectional~~ conduction path including a unidirectional isolation device and ~~impedance element~~,

the battery backup apparatus ~~connected to a plug on~~ configured to connect to a plug of the movable barrier operator, ~~the plug including a receptacle~~, and the battery charging circuit configured to receive a DC voltage from the DC power supply located within the movable barrier operator through the plug and ~~[[the]]~~ an impedance element in parallel with a second unidirectional isolation device disposed in the movable barrier operator to charge the battery when the DC voltage from the DC voltage supply exceeds a predetermined voltage,

the battery backup apparatus further configured to provide a battery backup voltage through the second unidirectional isolation device, the plug, and the unidirectional isolation device, the battery backup voltage being provided from the battery when mains voltage to the movable barrier operator fails.

16. (Currently Amended) A battery backup apparatus in combination with a movable barrier ~~movement~~ operator, the combination comprising:

a movable barrier operator, the movable barrier operator comprising:

a DC voltage supply having a mains input voltage, the mains input voltage receiving a mains voltage;

a barrier movement control coupled to the DC voltage supply via a DC power connection;

~~at least one unidirectional/impedance~~ an operator conductive path connected ~~[[to]]~~ between the DC voltage supply and a plug, the conductive path including ~~[[a]]~~ an operator unidirectional isolation device ~~[[and]]~~ in parallel with an impedance element;

~~[[a]]~~ the plug coupled to the conductive path, the plug externally accessible from the movable barrier operator ~~and including a receptacle~~;

a battery backup apparatus comprising:

a battery having first and second terminals;

a battery unidirectional isolation device operatively coupled between the battery and a battery conducting path configured to electrically connect to the plug; and

a battery charging circuit ~~which receives~~ configured to receive a DC voltage from the DC voltage supply via ~~the unidirectional/impedance conduction path which plug,~~ wherein the battery charging circuit ~~charges~~ is configured to charge the battery when the DC voltage from the DC voltage supply exceeds a predetermined voltage, ~~and a conduction path through the unidirectional isolation device connecting~~

wherein the battery is connected to provide a battery DC voltage from the first battery terminal to the DC voltage supply via the battery unidirectional isolation device, the plug, and the operator unidirectional isolation device such that a magnitude of the battery ~~[[dc]]~~ DC voltage is conducted along the ~~unidirectional/impedance operator~~ conduction path without being substantially adjusted by any intervening electrical device along the ~~unidirectional/impedance operator~~ conduction path when mains voltage to the mains voltage input fails.

17. (Previously Presented) The combination of claim 16 wherein the battery backup apparatus includes an audible signaling device.

18. (Currently Amended) The combination of claim 17 wherein the battery backup apparatus includes an apparatus for enabling the audible signaling device in response to current flowing from the battery to the DC voltage supply of the movable barrier operator via the battery unidirectional isolation device.

19. (Previously Presented) The combination of claim 16 wherein the battery backup apparatus includes one or more visual signaling devices.

20. (Previously Presented) The combination of claim 16 wherein the battery backup apparatus comprises circuitry for limiting a current applied to a battery terminal of the battery.

21. (Currently Amended) The combination of claim 20 wherein the circuitry for limiting[[,]] is configured to limit ~~limits~~ the current to an amount less than a predetermined maximum amount.

22. (Currently Amended) The combination of claim 16 wherein the battery backup apparatus includes cut out circuitry for disconnecting a battery terminal of the battery in response to determining a battery fault.

23. (Cancel)

24. (Currently Amended) The combination of claim 16 wherein the impedance element comprises at least one resistor, [[and]] the operator unidirectional isolation device comprises a diode, and the battery unidirectional isolation device comprises a diode.

25. (Previously Presented) The combination of claim 15 wherein the battery backup apparatus includes an audible signaling device.

26. (Previously Presented) The combination of claim 25 wherein the battery backup apparatus includes an apparatus for enabling the audible signaling device in response to current flowing from the battery to the DC voltage supply of the movable barrier operator via the unidirectional isolation device.

27. (Previously Presented) The combination of claim 15 wherein the battery backup apparatus includes one or more visual signaling devices.

28. (Previously Presented) The combination of claim 15 wherein the battery backup apparatus comprises circuitry for limiting a current applied to a battery terminal of the battery.

29. (Currently Amended) The combination of claim 28 wherein the circuitry for limiting[[,]] is configured to limit ~~limits~~ the current to an amount less than a predetermined maximum amount.

30. (Currently Amended) The combination of claim 15 wherein the battery backup apparatus includes cut out circuitry for disconnecting a battery terminal of the battery in response to determining a battery fault.

31. (Cancel)

32. (Currently Amended) The combination of claim 15 wherein the impedance element comprises at least one resistor, ~~[[and]]~~ the unidirectional isolation device comprises a diode, and the second unidirectional isolation device comprises a diode.

33. (Currently Amended) A battery backup apparatus in combination with a movable barrier movement ~~movement~~ operator, the combination comprising:
a movable barrier operator, the movable barrier operator comprising:

a DC voltage supply having a mains input voltage, the mains input voltage receiving a mains voltage;

a barrier movement control coupled to the DC voltage supply via a DC power connection;

~~at least one unidirectional/impedance~~ an operator conductive path connected ~~[[to]]~~ between the DC voltage supply and a plug, the conductive path including ~~a first branch including a~~ an operator unidirectional isolation device ~~and an a second branch including~~ connected in parallel with an impedance element, ~~the first branch being connected in parallel with the second branch~~;

~~[[a]]~~ the plug coupled to the conductive path, the plug externally accessible from the movable barrier operator ~~and including a receptacle~~;

a battery backup apparatus comprising:

a battery having first and second terminals;

a battery unidirectional isolation device operatively coupled between the battery and a battery conducting path configured to electrically connect to the plug;

a battery charging circuit ~~which receives~~ configured to receive a DC voltage from the DC voltage supply via ~~the plug, second branch of the unidirectional/impedance conduction path which~~

wherein the battery charging circuit charges is configured to charge the battery when the DC voltage from the DC voltage supply exceeds a predetermined voltage, ~~and a conduction path through the first branch of the unidirectional isolation device connecting~~

wherein the battery is connected to provide a battery DC voltage from the first battery terminal to the DC voltage supply via the battery unidirectional isolation device, the plug, and the operator unidirectional isolation device ~~such that a magnitude of the battery dc voltage is conducted along the unidirectional/impedance conduction path including the first branch without being substantially adjusted by any intervening electrical device along the first branch of the unidirectional/impedance conduction path~~ when mains voltage to the mains voltage input fails.

34. (Previously Presented) The combination of claim 33 wherein the battery backup apparatus includes an audible signaling device.

35. (Currently Amended) The combination of claim 34 wherein the battery backup apparatus includes an apparatus for enabling the audible signaling device in response to current flowing from the battery to the DC voltage supply of the movable barrier operator via the battery unidirectional isolation device.

36. (Previously Presented) The combination of claim 33 wherein the battery backup apparatus includes one or more visual signaling devices.

37. (Previously Presented) The combination of claim 33 wherein the battery backup apparatus comprises circuitry for limiting a current applied to a battery terminal of the battery.

38. (Currently Amended) The combination of claim 37 wherein the circuitry for limiting ~~[[,]]~~ is configured to limit ~~limits~~ the current to an amount less than a predetermined maximum amount.

39. (Currently Amended) The combination of claim 33 wherein the battery backup apparatus includes cut out circuitry for disconnecting a battery terminal of the battery in response to determining a battery fault.

40. (Currently Amended) The combination of claim 33 wherein the impedance element comprises at least one resistor, ~~[[and]]~~ the operator unidirectional isolation device comprises a diode, and the battery unidirectional isolation device comprises a diode.